TABLE 2.—*Free-air resultant winds (meters per second) based on pilot-balloon observations made near 5 a. m. (E. S. T.) during September 1935*

[Wind from N=360°, E=90°, etc.]

Altitude (m) m. s. l.	Albuquerque, N. Mex. (1,554 m)		Atlanta, Ga. (309 m)		Billings, Mont. (1,088 m)		Boston, Mass. (15 m)		Cheyenne, Wyo. (1,873 m)		Chicago, Ill. (192 m)		Cincinnati, Ohio (153 m)		Detroit, Mich. (204 m)		Fargo, N. Dak. (274 m)		Houston, Tex. (21 m)		Key West, Fla. (11 m)		Medford, Oreg. (410 m)		Murfreesboro, Tenn. (180 m)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
	°		°		°		°		°		°		°		°		°		°		°		°		°	
Surface	5	0.4	24	1.4	278	1.6	296	1.3	278	2.5	195	0.9	63	0.7	277	1.3	191	0.5	20	2.3	99	1.6	99	0.1	56	0.2
500	-----	-----	67	2.8	-----	-----	295	4.5	-----	-----	246	4.0	258	2.3	276	3.3	196	1.9	101	3.2	103	3.7	320	0.2	139	3.0
1,000	-----	-----	98	3.8	-----	-----	304	5.3	-----	-----	264	5.1	280	5.2	278	4.9	279	3.0	125	4.1	103	3.2	250	0.9	173	2.2
1,500	-----	-----	97	3.3	238	2.3	289	5.8	-----	-----	279	6.5	285	5.5	294	6.9	288	5.1	122	3.0	119	3.1	169	0.7	239	1.6
2,000	167	1.9	98	2.6	279	2.1	287	9.0	273	5.1	284	5.8	289	6.2	289	8.2	293	7.7	102	1.7	121	2.3	138	1.2	261	1.1
2,500	206	1.1	90	2.3	279	4.0	290	11.6	281	6.1	275	7.2	308	4.8	283	9.6	272	7.0	171	0.5	120	2.2	231	2.2	260	0.5
3,000	242	1.4	92	1.6	274	5.4	289	14.1	284	4.8	279	8.6	323	6.5	278	10.9	285	10.2	217	1.1	159	1.4	239	3.8	235	1.4
4,000	301	1.3	70	0.8	270	9.6	280	14.6	280	6.0	286	12.6	-----	-----	286	13.5	-----	-----	249	0.8	211	1.6	248	4.4	25	1.0
5,000	229	2.9	244	3.4	284	10.4	-----	-----	289	6.7	-----	-----	-----	-----	293	14.7	-----	-----	347	1.0	-----	-----	344	2.0	-----	-----

Altitude (m) m. s. l.	Newark, N. J. (14 m)		Oakland, Calif. (8 m)		Oklahoma City, Okla. (402 m)		Omaha, Nebr. (306 m)		Pearl Harbor, Territory of Hawaii [1] (68 m)		Pensacola, Fla.[1] (24 m)		St. Louis, Mo. (170 m)		Salt Lake City, Utah (1,294 m)		San Diego, Calif. (15 m)		Sault Ste. Marie, Mich. (198 m)		Seattle, Wash. (14 m)		Spokane, Wash. (603 m)		Washington, D. C. (10 m)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
	°		°		°		°		°		°		°		°		°		°		°		°		°	
Surface	344	1.6	12	1.1	189	1.4	158	1.7	55	2.1	43	3.8	220	1.1	150	3.4	15	2.6	41	0.8	150	0.5	78	1.5	278	0.3
500	330	3.3	219	1.1	179	3.8	204	5.3	81	2.6	81	4.4	215	5.7	-----	-----	345	2.6	290	1.3	22	0.4	-----	-----	276	2.2
1,000	292	5.1	336	1.9	188	5.5	239	9.4	85	4.8	89	3.5	241	4.8	-----	-----	340	2.0	288	4.8	302	0.7	230	1.6	293	3.6
1,500	296	6.9	357	2.0	186	3.9	248	8.4	95	3.6	96	2.8	265	5.1	154	4.2	249	0.2	296	6.9	233	1.2	248	2.5	299	5.8
2,000	286	7.6	195	2.0	183	2.8	259	5.8	96	2.3	69	3.9	267	5.0	191	2.4	188	1.8	295	7.6	239	1.5	248	2.9	298	7.8
2,500	-----	-----	183	3.5	165	2.3	287	5.6	227	2.6	61	4.4	271	4.8	244	1.9	155	3.8	302	9.6	266	3.4	260	5.0	292	7.6
3,000	-----	-----	-----	-----	118	1.5	287	5.6	-----	-----	60	2.6	260	4.7	270	2.6	155	4.7	303	12.0	283	3.5	263	6.6	288	7.6
4,000	-----	-----	-----	-----	35	1.8	286	5.4	-----	-----	307	2.0	249	4.7	277	4.2	149	2.8	-----	-----	270	7.5	271	6.3	282	8.3
5,000	-----	-----	-----	-----	349	4.1	303	7.3	-----	-----	-----	-----	-----	-----	270	4.7	63	0.8	-----	-----	266	7.4	317	6.8	-----	-----

[1] Navy stations.

RIVERS AND FLOODS

[River and Flood Division, MONTROSE W. HAYES, in charge]

By RICHMOND T. ZOCH

The most important flood in the United States during September was the one in the James River in Virginia. This river reached higher stages at Columbia and Richmond, Va., than had been reached at these gage stations since the great flood of November 1877.

There were heavy rains over the James River basin early in the month. The total rainfall for the 5th and 6th averaged 6.5 inches for the entire basin, but the rain was considerably heavier east of the Blue Ridge; in fact the river did not reach flood stage at or above Lynchburg. It is quite unusual for the river to reach such high stages at Columbia and Richmond, and yet remain below flood in its upper reaches.

Portions of Richmond are flooded when the river reaches a stage of 8 feet. Until 1927 the main lower business section invariably suffered heavy losses, but in that year a dike was constructed which protects this section of the city up to stages of 21 feet. As a stage higher than this was forecast, the city had sandbags placed on the dikes and took numerous other precautions, and as a result of these emergency measures the lower business section was not flooded, although the river reached a stage of 23.65 feet. The crest stage forecast was 24 feet. However, the gas plant was flooded, and the city was without gas for several days.

There were unusually heavy rains in the Rio Grande Valley in the vicinity of Las Cruces, N. Mex., on the night of August 29–30. The floods caused by them did not subside until early in September. The damage caused by these floods, which extended from Elephant Butte, N. Mex., to El Paso, Tex., exceeded $1,000,000. The Weather Bureau has no river gages in this reach of the Rio Grande. The floods in the lower Rio Grande were not serious.

Rains on September 4 to 6 were the heaviest of record over most of southern Delaware and the Eastern shore of Maryland; and they caused floods in all of the streams of that region, with extensive damage.

Table of flood stages during September 1935

[All dates are in September, unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC SLOPE DRAINAGE					
James:	*Feet*			*Feet*	
Columbia, Va	10	5	10	35.0	6
Richmond, Va	8	6	9	23.6	7
Roanoke:					
Randolph, Va	18	6	8	25.2	8
Weldon, N. C	31	7	10	35.9	9
Williamston, N. C	10	12	18	10.7	15
Fishing Creek: Enfield, N. C	14	7	9	15.8	8
Tar:					
Rocky Mount, N. C	8	6	9	9.0	8
Tarboro, N. C	18	11	11	18.8	11
Greenville, N. C	12	9	15	14.7	12
Neuse:					
Neuse, N. C	13	6	8	15.0	6
Smithfield, N. C	12	7	9	15.5	8
Haw: Moncure, N. C	19	6	6	22.0	6
Cape Fear: Lock No. 2, Elizabethtown, N. C	20	7	9	26.0	7
Waccamaw: Conway, S. C	7	23	25	7.1	23–25
Santee:					
Rimini, S. C	12	1	2	12.8	1
		5	20	14.0	14
		27	28	12.0	28
Ferguson, S. C	12	2	2	12.0	2
		6	23	13.3	14, 15
		1	1	14.8	1
Savannah: Ellenton, S. C	14	7	9	15.8	9
		13	14	15.0	13, 14
MISSISSIPPI SYSTEM					
Missouri Basin					
Solomon: Beloit, Kans	18	2	3	23.0	3
		10	10	19.6	10
Republican:					
Concordia, Kans	8	10	10	8.5	10
Clay Center, Kans	12	1	2	14.9	2
		11	11	13.4	11

Table of flood stages during September 1935—Continued

[All dates are in September, unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
MISSISSIPPI SYSTEM—continued					
Ohio Basin					
Hocking: Athens, Ohio	*Feet* 17	4	6	*Feet* 19.7	5
Arkansas Basin					
Purgatoire: Higbee, Colo	4	8	8	4.0	8
North Canadian: Yukon, Okla	8	6	6	8.1	8
WEST GULF OF MEXICO DRAINAGE					
Colorado:					
Columbus, Tex	24	8	13	30.2	13
Wharton, Tex	26	9	15	32.4	14
Guadalupe:					
Gonzales, Tex	20	8	8	20.5	8
Victoria, Tex	21	10	11	22.4	11
		28	Oct. 1	28.2	Oct. 1
Rio Grande:					
Del Rio, Tex	15	4	6	24.5	5
		8	8	21.5	8
Eagle Pass, Tex	16	5	7	30.4	6
		8	9	23.8	9
Laredo, Tex	27	7	8	30.3	7
Riogrande, Tex	21	8	11	26.5	9
Hidalgo, Tex	21	9	13	23.4	12
Mercedes, Tex	21	9	15	22.6	11
Brownsville, Tex	18	10	15	18.3	13

WEATHER OF THE ATLANTIC AND PACIFIC OCEANS

[The Marine Division, W. F. McDONALD in Charge]

NORTH ATLANTIC OCEAN, SEPTEMBER 1935

By H. C. HUNTER

Atmospheric pressure.—Pressure averaged slightly below normal over most of the North Atlantic area; but around the British Isles, particularly to westward and northward, it averaged considerably below, while over waters near Portugal and northwestern Africa it was above normal.

The highest barometer reading so far noted at sea was 30.55 inches, by the British motorship *Cheyenne* on the 30th, very near Horta. The American tanker *Pueblo*, on the evening of the 2d, experienced the lowest pressure any vessel has yet reported this month, 27.18 inches, about 24°35′ N., 80°20′ W., in the hurricane that swept the Florida Straits on that date; for that part of the ocean remote from the tropics, the lowest was 28.02 inches, by the American steamship *Black Condor*, noted during the evening of the 8th, near 51° N., 31° W.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure (sea level) at selected stations for the North Atlantic Ocean and its shores, September 1935*

Station	Average pressure	Departure	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Julianehaab, Greenland	29.70		30.04	22	28.89	28
Reykjavik, Iceland	29.68	−0.04	30.27	7	29.17	29
Lerwick, Shetland Islands	29.62	−.22	30.29	8, 9	28.87	19
Valencia, Ireland	29.78	−.21	30.11	7	29.29	15
Lisbon, Portugal	30.12	+.10	30.33	9	29.95	7
Madeira	30.10	+.08	30.18	18	30.00	7, 28
Horta, Azores	30.14	−.03	30.50	30	29.79	6
Belle Isle, Newfoundland	29.82	−.08	30.34	5	29.18	30
Halifax, Nova Scotia	30.00	−.05	30.34	4, 18	29.46	10
Nantucket	30.04	−.04	30.35	25	29.50	6
Hatteras	30.02	−.04	30.29	25	29.56	6
Bermuda	30.07	−.01	30.21	3	29.80	30
Turks Island	29.97	−.01	30.05	12	29.86	26
Key West	29.90	−.04	30.05	12	29.41	3
New Orleans	29.95	−.03	30.12	13	29.73	14

NOTE.—All data based on a. m. observations only, with departures compiled from best available normals related to time of observation, except Hatteras, Key West, Nantucket, and New Orleans, which are 24-hour means.